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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 09/982,067  | 10/17/2001  | Qinbai Fan           | GTI-1476            | 7277             |
| 7590  | 06/02/2004  |                      | EXAMINER            |                  |
| Mark E Fejer<br>Gas Technology Institute<br>1700 South Mount Prospect Road<br>Des Plaines, IL 60018 |             |                      | WILLS, MONIQUE M    |                  |
|   |             | ART UNIT             | PAPER NUMBER        |                  |
|   |             |                      | 1746                |                  |

DATE MAILED: 06/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

|                 |            |  |
|-----------------|------------|--|
| Application No. | 09/982,067 |  |
| Examiner        | Art Unit   |  |
| Monique M Wills | 1746       |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1) Responsive to communication(s) filed on 17 October 2001.  
2a) This action is FINAL.                            2b) This action is non-final.  
3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4) Claim(s) 1-22 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) Claim(s) \_\_\_\_\_ is/are allowed.  
6) Claim(s) 1-22 is/are rejected.  
7) Claim(s) \_\_\_\_\_ is/are objected to.  
8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

9) The specification is objected to by the Examiner.  
10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) All    b) Some \* c) None of:  
1. Certified copies of the priority documents have been received.  
2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) Notice of References Cited (PTO-892)  
2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.

4) Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.  
5) Notice of Informal Patent Application (PTO-152)  
6) Other: \_\_\_\_\_.

## DETAILED ACTION

*Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless —

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-10 & 12-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Davis U.S. Patent 5,904,740.

With respect to claims 1 & 15, Davis teaches a sulfuric acid-free fuel composition for use in liquid feed polymer electrolyte membrane fuel cells comprising an electrolyte 18 having an anode side 14, cathode side 16 (col. 4, lines 60-68) and consumable methanol as a carbonaceous material on the anode side (col. 2, lines 50-68). With respect to claim 5, methanol is mixed with ethanol, n-propanol or butanol (col. 2, lines 50-68 and col. 6, lines 15-25), which have molecular sizes larger than methanol. With respect to claims 6 & 17, the consumable carbonaceous material is methanol (col. 2, lines 50-60). With respect to claims 7-10 & 17-21, methanol is mixed with ethanol, n-propanol or butanol (col. 2, lines 50-68 and col. 6, lines 15-25), which have molecular sizes larger than methanol. With respect to claim 12, the electrochemical device is a direct methanol fuel cell (col. 6, lines 1-9). With respect to claim 13, the electrolyte is a solid polymer electrolyte (col. 4, lines 59-68). With respect to claim 14, the electrolyte is fluorosulfonic acid (col. 4, lines 60-68). The instant claims are anticipated by the prior art set forth. The limitation in claims 1 & 15, with respect to the crossover means comprising a chemical barrier disposed on the

anode side of the electrolyte, is considered to be an inherent property of the fuel mixture as set forth in the prior art, because Davis employs the same methanol/alcohol mixture set forth by Applicant. The limitation in claims 2 & 16 with respect to the chemical additive being non-consumable, is considered to be an inherent property of fuel mixture as set forth in the prior art, because Davis employs the same methanol/alcohol mixture set forth by Applicant. The limitation in claim 3 with respect to the solid electrolyte comprising a plurality of crossover sites suitable for crossover of the carbonaceous material, is considered to be an inherent property of the solid electrolyte as set forth in the prior art, because Davis employs the same electrolyte polymers set forth by Applicant. The limitation in claim 4, with respect to the chemical additive being suitable for attachment to the crossover sites, is considered to be an inherent property of fuel mixture as set forth in the prior art, because Davis employs the same methanol/alcohol mixture set forth by Applicant. The limitation in claims 5,7 & 18 with respect to the chemical additive having a molecular size larger than methanol, is considered to be an inherent property of fuel mixture as set forth in the prior art, because Davis employs the same methanol/alcohol mixture set forth by Applicant.

*Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented

and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 11 & 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Davis U.S. Patent 5,904,740 in view of Peled et al., U.S. Patent 6,447,943.

Davis, as applied to the subject matter of claims 1 & 15 above, teaches a fuel composition comprising methanol and formic acid as described hereinabove that differs from the claim only in the recitation of the chemical additive being ethylene glycol.

Davis is silent to the chemical additive ethylene glycol.

Peled teaches the functional equivalence of formic acid and ethylene glycol as fuel additives in liquid feed fuel cells (col. 3, lines 35-45).

It therefore would have been obvious to one having ordinary skill in the art, at the time the instant invention was made to substitute for the additive in Davis, the ethylene glycol additive in the fuel, as taught by Peled, since Peled teaches that ethylene glycol and formic acid are art recognized equivalent material for use as fuel additives in liquid feed fuel cells, and therefore one having ordinary skill in the art would have substituted one material for the other. See MPEP 2144.06 “substituting equivalent known for the same purpose”).

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Monique Wills whose telephone number is (571) 272-1309. The Examiner can normally be reached on Monday-Friday from 8:30am to 5:00 pm.

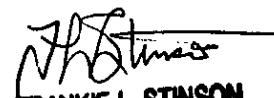
If attempts to reach Examiner by telephone are unsuccessful, the Examiner's supervisor, Randy Gulakowski, may be reached at 571-272-1302. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MW

05/31/04



FRANKIE L. STINSON  
PRIMARY EXAMINER  
GROUP 3400 1700